

LEAD-FREE TIN-SILVER-COPPER ALLOY SOLDER COMPOSITION

Abstract of the Disclosure

A solder composition and associated method of formation. The solder composition comprises a substantially lead-free alloy that includes tin (Sn), silver (Ag), and copper. The tin has a weight percent concentration in the alloy of at least about 90%. The silver has a weight percent concentration X in the alloy. X is sufficiently small that formation of Ag_3Sn plates is substantially suppressed when the alloy in a liquefied state is being solidified by being cooled to a lower temperature at which the solid Sn phase is nucleated. This lower temperature corresponds to an undercooling δT relative to the eutectic melting temperature of the alloy. Alternatively, X may be about 4.0% or less, wherein the liquefied alloy is cooled at a cooling rate that is high enough to substantially suppress Ag_3Sn plate formation in the alloy. The copper has a weight percent concentration in the alloy not exceeding about 1.5%.